2 Total Energy Use

The following pages present an overview of Wisconsin's annual energy use from 1970 to 2007. There are two common ways to account for energy use: *resource* energy consumption and *end use* energy consumption. End use refers to the energy content of electricity and other fuels at the point of use by customers. Resource energy includes all energy resources used to generate electricity, including the energy content of the coal, petroleum, nuclear and renewable fuels. Resource energy also includes the energy used to produce the electricity imported into Wisconsin from other states and Canada. Because about 70 percent of the energy used to generate and distribute electricity to its point of use is lost as waste heat, resource consumption figures are greater than end use consumption figures.

The chapter begins by presenting resource energy use by type of fuel: petroleum, natural gas, coal, renewable energy resources, nuclear power and imported electricity. (Most renewable resource information, including solar and wind energy, is presented in Chapter 4.) The second table shows resource energy use by economic sector: residential, commercial*, industrial, agricultural and transportation. In the next two tables, annual consumption of end use energy also is presented by fuel type and by economic sector. Several tables follow which detail energy use information for each economic sector.

In 2007, total resource energy consumption in Wisconsin increased 4.5 percent, following a 2.1 percent decrease in 2006.

Electricity imported into Wisconsin increased 56.2 percent. Natural gas used for electricity generation increased 6.1 percent. Electricity imports represent 6.8 percent of all resource energy used, similar to 2005.

Petroleum use increased 0.3 percent in 2007, after decreasing 1.4 percent in 2006. Prior to 1996, petroleum was Wisconsin's leading energy source, but its share of resource energy use has fallen from a peak of 40 percent in 1977 to 29.4 percent in 2007. Petroleum and coal continue to be the leading resource energy sources in Wisconsin.

In 2007, coal end use by Wisconsin industry and electric utilities increased 0.3 percent. Coal accounts for 29.3 percent of Wisconsin's resource energy use. Coal surpassed natural gas as the state's second largest energy source in 1981, and in 1996 coal surpassed petroleum as the state's leading source of resource energy, a lead it held until 2005. Coal and petroleum contribute the same amount of resource energy. In 2007, natural gas resource use increased 6.1 percent.

End use electricity consumption increased 2.2 percent in 2007. Electricity accounted for 20.1 percent of end use energy in 2007, compared to 8.6 percent in 1970.

In general, the residential and industrial sectors each accounted for about one-quarter of Wisconsin's resource energy consumption in 2007, 24.6 and 27.5 percent, respectively. The transportation sector used 25.4 percent of the state's resource energy while the commercial and agricultural sectors accounted for 20.8 percent and 2.0 percent, respectively. In 2007, residential energy use increased 8.5 percent, commercial energy use increased 6.5 percent, industrial energy use decreased 2.4 percent, agricultural energy use increased 2.5 percent and transportation energy use increased 1.8 percent.

*In this report, commercial is defined broadly to include enterprises selling goods and services, as well as establishments such as religious and government institutions that provide other kinds of services.

End Use Energy Consumption by Sector

In the **residential sector**, end use energy consumption increased 6.7 percent in 2007. Electricity consumption increased 4.1 percent from its 2006 level. Residential petroleum use decreased 1.3 percent in 2007. Between 1970 and 2007, petroleum use in the residential sector declined 67.9 percent. Natural gas use increased 8.4 percent from 2006. Natural gas continues to be the dominant energy source in this sector. The natural gas share of residential end use energy consumption has increased from 40.7 percent in 1970 to 48.8 percent in 2007.

Commercial sector end use energy consumption increased 2.6 percent in 2007. There was a 3.1 percent increase in electricity use and a 2.5 percent decrease in petroleum use, while natural gas use increased by 2.6 percent. Natural gas remains the major energy source, providing 48.3 percent of commercial sector energy in 2007. Electricity use in this sector increased 308.7 percent between 1970 and 2007. Electricity's share of total commercial energy use has increased from 19 percent in 1970 to 43.2 percent in 2007. Petroleum's importance in this sector has declined from providing 28.3 percent of the energy used in 1970, to presently accounting for only 5.6 percent of total commercial energy consumption.

Industrial sector end use energy consumption decreased 1.1 percent in 2007. Natural gas use increased 0.2 percent, and electricity use increased 0.6 percent, while petroleum use decreased 18.8 percent. Natural gas accounts for 41.5 percent of industrial end use energy needs, with coal at 16 percent and electricity at 30.1 percent. The remaining 12.4 percent is split between petroleum and renewable energy. Petroleum contributes slightly more to Wisconsin's industrial energy needs than renewables. However, renewable energy use may exceed petroleum in the future as renewable energy technologies mature.

In the **electricity generation sector**, since the early 1980s, the generation of electricity from coal and nuclear power has dominated. Coal use increased 0.4 percent and imports of electricity (and associated losses) from other states and Canada increased 56.2 percent. Petroleum use increased 22.9 percent and natural gas use increased 22.5 percent. In 2007, of the electricity produced in Wisconsin by utilities (investor-owned, cooperatives, and municipal) and independent power producers, coal provided 59.1 percent and nuclear generation provided 16.7 percent of the needed energy. In 2007, the proportion provided by petroleum, natural gas, renewables and hydropower was only 9.7 percent.

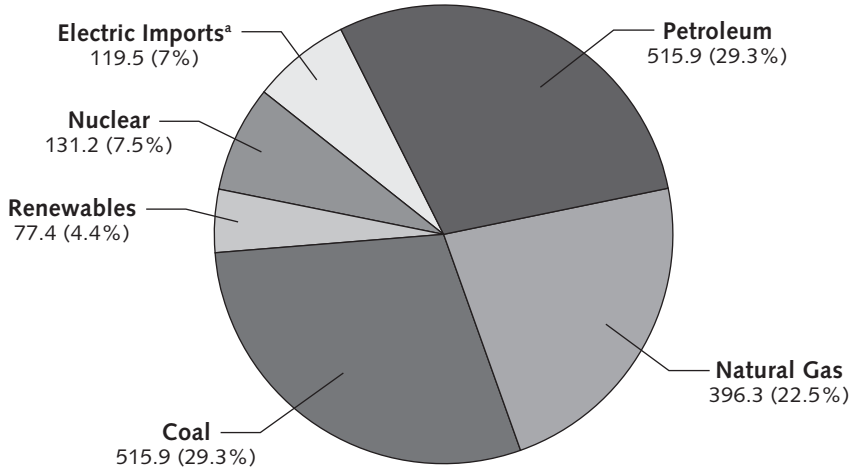
Agricultural sector energy use accounted for 2.0 percent of total Wisconsin end use energy. Electricity's share of energy used by agriculture was 20 percent. Data specific to the Agricultural sector look different starting in 2005 than in previous years due to the addition of new data sources. A survey of farm production (e.g., crops, dairy) was replaced with state Department of Revenue data and federal data from the National Agriculture Statistics Service. Previously uncollectible data, such as gallons of untaxed (dyed) diesel fuel used in agricultural applications, was available beginning in 2005. These data will continue to be part of the agricultural sector data in subsequent years.

In the **transportation sector**, since 2005, the average statewide price of gasoline increased 54.5 cents a gallon or 23.5 percent (page 102). In 2007, the average statewide price of gasoline increased by 35.9 cents a gallon, to $2.321 a gallon. Ethanol, a renewable energy resource primarily distilled from corn, is used as an oxygenate in reformulated gasoline and in the blending of E10 (10 percent ethanol, 90 percent gasoline) and E85 (85 percent ethanol, 15 percent gasoline). Ethanol use in gasoline sold in Wisconsin has increased and now provides 3.1 percent of the transportation energy. Diesel fuel is used primarily for trucking freight. Overall, transportation's use of energy increased 1.8 percent. Transportation activities consume 25.4 percent of Wisconsin's total end use energy, accounting for 83.5 percent of petroleum use.

Wisconsin Resource Energy Consumption, by Type of Fuel

2007

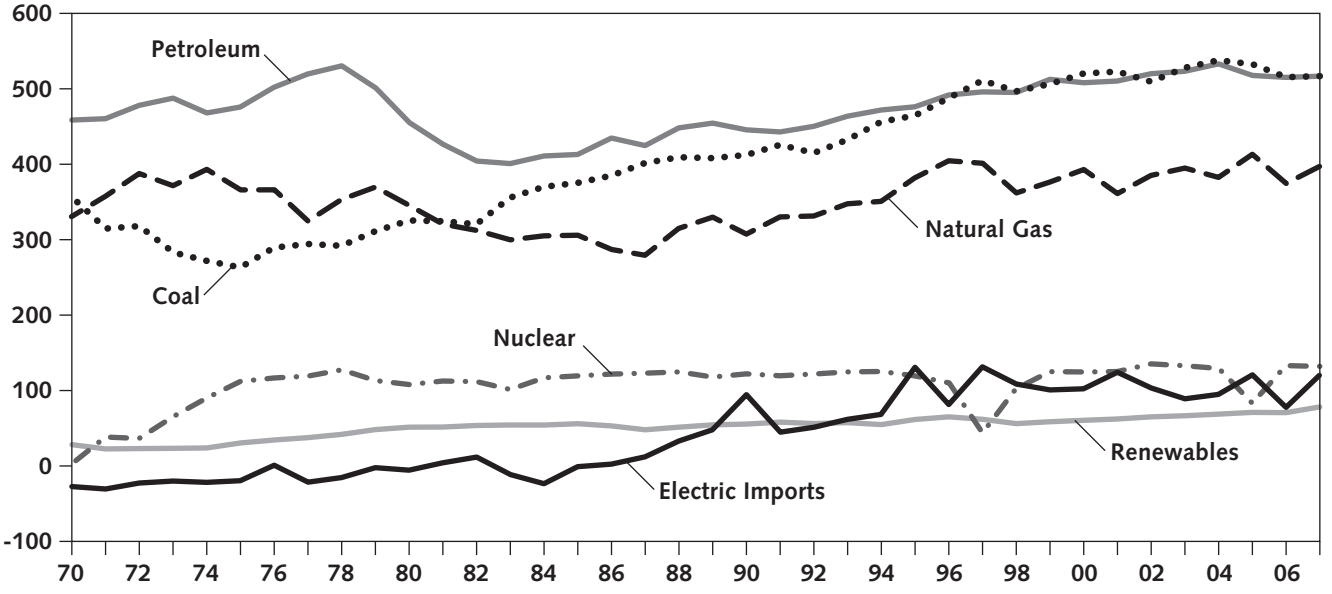
(Trillions of Btu and Percent of Total)



Total Energy Consumption: 1,756.1

1970-2007

(Trillions of Btu)



[a] "Electric imports" is the estimated resource energy used in other states or Canada to produce the electricity imported into Wisconsin. This resource energy is estimated assuming 11,300 Btu of resource energy per kWh imported into Wisconsin. Values below the "0" indicate that resource energy was used in Wisconsin to produce electricity that was exported out of state.

Source: Wisconsin Office of Energy Independence

Wisconsin Resource Energy Consumption, by Type of Fuel 1970-2007

(Trillions of Btu and Percent of Total)

Resource energy consumption increased 4.5 percent in 2007. Petroleum use increased 0.3 percent; natural gas, increased 6.1 percent; coal, increased 0.3 percent; renewables, increased 10.8 percent; and nuclear use decreased by 0.7 percent.

Year	Petroleum		Natural Gas		Coal[a]		Renewables[b]		Nuclear		Electric Imports[c]		Total
1970	457.7	(40.0%)	329.8	(28.8%)	355.4	(31.1%)	27.4	(2.4%)	1.7	(0.1%)	(28.2)	-(2.5)	1,143.8
1975	475.0	(38.8)	365.1	(29.9)	262.3	(21.5)	29.6	(2.4)	111.2	(9.1)	(20.4)	-(1.7)	1,222.8
1980	454.4	(35.6)	344.5	(27.0)	324.6	(25.5)	50.5	(4.0)	107.0	(8.4)	(6.5)	-(0.5)	1,274.6
1985	412.1	(32.6)	305.0	(24.1)	374.4	(29.6)	55.1	(4.4)	118.6	(9.4)	(1.8)	-(0.1)	1,263.4
1990	444.7	(31.1)	306.4	(21.4)	411.4	(28.7)	54.6	(3.8)	121.2	(8.5)	93.2	(6.5)	1,431.6
1995	475.3	(29.2)	381.1	(23.4)	463.7	(28.5)	60.7	(3.7)	118.5	(7.3)	129.4	(7.9)	1,628.7
2000	507.2	(29.8)	392.0	(23.0)	519.4	(30.5)	59.6	(3.5)	123.8	(7.3)	101.4	(6.0)	1,703.5
2001	509.4	(30.0)	360.1	(21.2)	521.9	(30.7)	61.4	(3.6)	124.3	(7.3)	123.3	(7.2)	1,700.4
2002	519.2	(30.3)	384.3	(22.4)	508.5	(29.7)	64.2	(3.7)	134.4	(7.8)	102.5	(6.0)	1,713.1
2003	522.4	(30.2)	394.0	(22.8)	527.0	(30.5)	65.7	(3.8)	132.0	(7.6)	88.2	(5.1)	1,729.3
2004	532.1	(30.6)	381.6	(21.9)	537.0	(30.8)	67.8	(3.9)	128.4	(7.4)	94.0	(5.4)	1,741.0
2005	516.9	(29.8)	412.1	(23.8)	531.7	(30.7)	70.1	(4.0)	81.8	(4.7)	119.7	(6.9)	1,732.3
2006	514.2	(30.6)	373.5	(22.2)	514.6	(30.6)	69.8	(4.2)	132.1	(7.9)	76.5	(4.6)	1,680.7
2007[p]	**515.9**	**(29.4)**	**396.3**	**(22.6)**	**515.9**	**(29.4)**	**77.4**	**(4.4)**	**131.2**	**(7.5)**	**119.5**	**(6.8)**	**1,756.1**

[a] Including petroleum coke.

[b] Renewables includes solar, wind, wood, biogas, biomass, ethanol and hydroelectric.

[c] Electric imports are the estimated resource energy used in other states or Canada to produce the electricity imported into Wisconsin. This resource energy is estimated assuming 11,300 Btu of resource energy per kWh imported into Wisconsin. Negative percentages indicate that resource energy was used in Wisconsin to produce electricity that was exported out of state.

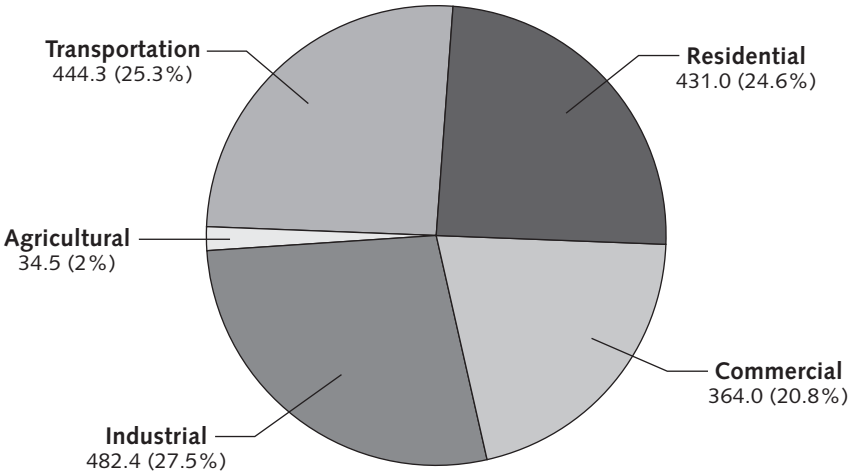
[p] Preliminary estimates.

Source: Compiled from tables in this publication for Wisconsin petroleum, natural gas, coal, renewable resources and electricity use, by economic sector, and for Wisconsin electric utility energy use.

Wisconsin Resource Energy Consumption, by Economic Sector

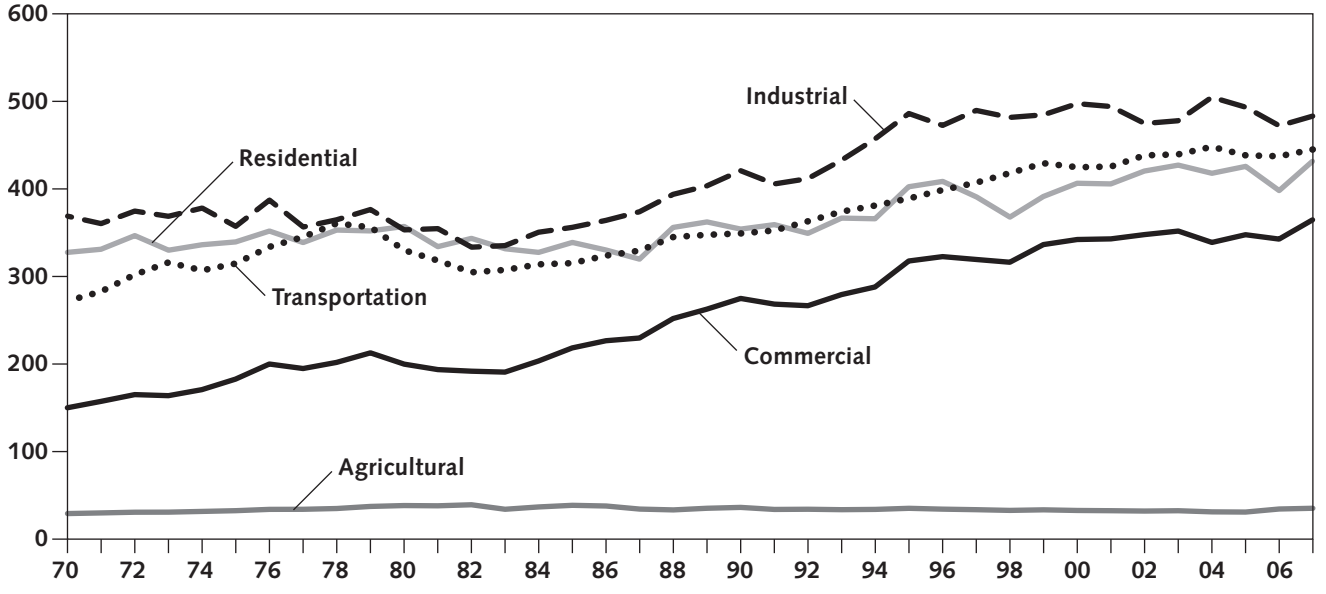
2007

(Trillions of Btu and Percent of Total)



1970-2007

(Trillions of Btu)



Source: Wisconsin Office of Energy Independence.

Wisconsin Resource Energy Consumption, by Economic Sector[r] 1970-2007

(Trillions of Btu and Percent of Total)

Total resource energy consumption increased 4.5 percent in 2007. The largest increase (8.5 percent) was in the residential sector which includes any fuel used for space and water heating, and appliances.

Year	Residential		Commercial		Industrial		Agricultural[a]		Transportation		Total
1970	326.7	(28.6%)	149.3	(13.1%)	368.1	(32.2%)	28.4	(2.5%)	271.2	(23.7%)	1,143.8
1975	338.7	(27.7)	182.0	(14.9)	356.3	(29.1)	31.7	(2.6)	314.0	(25.7)	1,222.8
1980	356.3	(28.0)	199.1	(15.6)	352.4	(27.6)	37.6	(2.9)	329.2	(25.8)	1,274.6
1985	338.1	(26.8)	217.6	(17.2)	355.3	(28.1)	37.8	(3.0)	314.4	(24.9)	1,263.3
1990	353.3	(24.7)	274.1	(19.2)	420.0	(29.3)	35.5	(2.5)	348.4	(24.3)	1,431.2
1995	401.7	(24.7)	316.9	(19.5)	485.3	(29.8)	34.4	(2.1)	388.3	(23.9)	1,626.7
2000	405.7	(24.1)	341.4	(20.3)	496.6	(29.5)	17.6	(1.0)	424.0	(25.2)	1,685.3
2001	404.9	(24.1)	342.2	(20.3)	493.3	(29.3)	17.8	(1.1)	424.7	(25.2)	1,682.9
2002	419.7	(24.8)	347.1	(20.5)	473.9	(28.0)	16.9	(1.0)	437.5	(25.8)	1,695.1
2003	426.4	(24.9)	351.1	(20.5)	477.1	(27.9)	17.2	(1.0)	438.7	(25.6)	1,710.5
2004	417.1	(24.2)	338.1	(19.6)	503.9	(29.3)	16.2	(0.9)	447.3	(26.0)	1,722.5
2005	424.9	(24.5)	346.9	(20.0)	492.6	(28.4)	30.2	(1.7)	437.6	(25.2)	1,732.1
2006	397.1	(23.7)	341.9	(20.4)	471.3	(28.1)	33.6	(2.0)	436.5	(26.0)	1,680.5
2007[p]	**431.0**	**(24.6)**	**364.0**	**(20.8)**	**482.4**	**(27.5)**	**34.5**	**(2.0)**	**444.3**	**(25.4)**	**1,756.1**

[a] OEI discontinued a per-acre approach to gathering fuel data for the agriculture sector and substituted data from the Wisconsin Department of Revenue and from the federal National Agriculture Statistics Service (NASS). Data from NASS were not available previously. Using former methodology, the figures for 2005 through 2007 are: 2005, 31.3 (1.8%); 2006, 30.5 (1.8%); and 2007, 30.0 (1.7%).

[p] Preliminary estimates.

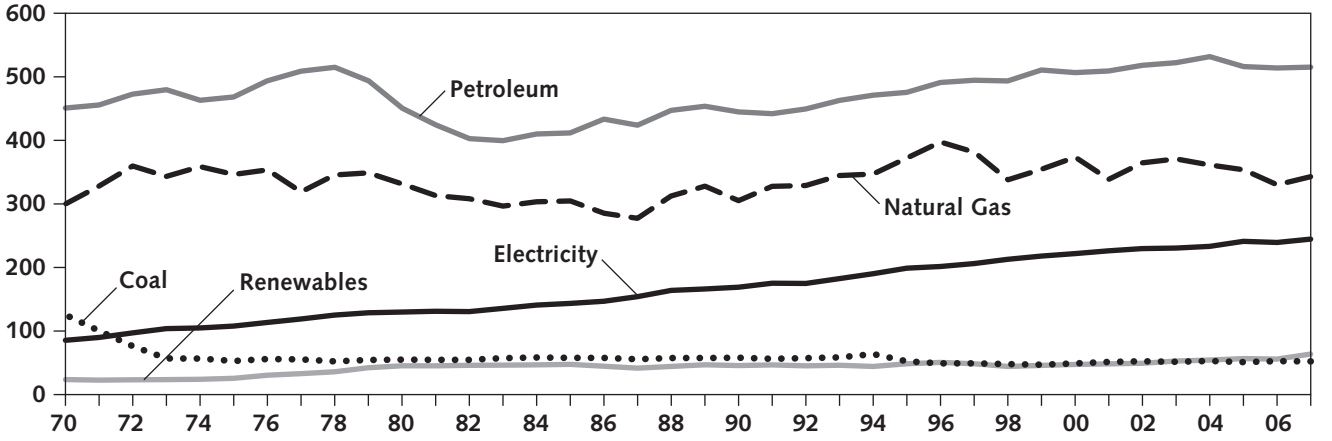
[r] Revised due to revisions in contributing tables.

Source: Compiled from tables in this publication for Wisconsin petroleum, natural gas, coal, renewable energy and electricity use, by economic sector, and for Wisconsin electric utility energy use.

Wisconsin End Use Energy Consumption, by Type of Fuel[r] 1970-2007

(Trillions of Btu and Percent of Total)

End use energy is a measure of the energy content of fuels at the point of consumption. Since much of the energy needed to generate electricity is lost in the generation process, end use energy consumption figures will always be lower than the directly linked resource energy consumption figures. End use energy increased for all fuels, except coal, in 2007. Overall, end use growth in 2007 increased 2.3 percent after decreasing 2.6 percent in 2006. Petroleum continued to be the most-used end use energy source in Wisconsin.



Year	Petroleum		Natural Gas		Coal		Renewables		Electricity		Total
1970	449.8	(45.9%)	298.7	(30.5%)	124.3	(12.7%)	22.6	(2.3%)	84.4	(8.6%)	979.7
1975	467.2	(46.9)	345.3	(34.7)	51.8	(5.2)	24.6	(2.5)	106.7	(10.7)	995.6
1980	449.6	(44.6)	330.4	(32.8)	53.9	(5.4)	44.2	(4.4)	128.8	(12.8)	1,007.0
1985	410.7	(42.8)	303.6	(31.6)	56.7	(5.9)	46.5	(4.8)	142.4	(14.8)	959.9
1990	443.7	(43.6)	304.0	(29.9)	56.9	(5.6)	44.6	(4.4)	167.9	(16.5)	1,017.1
1995	474.5	(41.5)	371.0	(32.5)	51.3	(4.5)	47.4	(4.2)	197.8	(17.6)	1,142.0
2000	505.6	(42.4)	372.4	(31.2)	48.0	(4.0)	46.4	(3.9)	220.8	(18.5)	1,193.2
2001	508.1	(43.5)	337.5	(28.9)	50.3	(4.3)	47.3	(4.0)	225.2	(19.3)	1,168.4
2002	517.1	(42.8)	363.6	(30.1)	51.3	(4.2)	48.2	(4.0)	228.7	(18.9)	1,208.9
2003	521.2	(42.6)	369.7	(30.2)	50.5	(4.1)	51.7	(4.2)	229.5	(18.8)	1,222.6
2004	530.6	(43.2)	360.2	(29.3)	51.9	(4.2)	53.3	(4.3)	232.2	(18.9)	1,228.1
2005	515.1	(42.4)	352.7	(29.1)	50.0	(4.1)	55.6	(4.6)	240.1	(19.8)	1,213.4
2006	512.8	(43.2)	329.0	(27.7)	51.6	(4.3)	54.8	(4.6)	238.3	(20.1)	1,186.5
2007[p]	**514.2**	**(42.4)**	**341.8**	**(28.2)**	**51.2**	**(4.2)**	**62.7**	**(5.2)**	**243.6**	**(20.1)**	**1,213.4**

[p] Preliminary estimates.

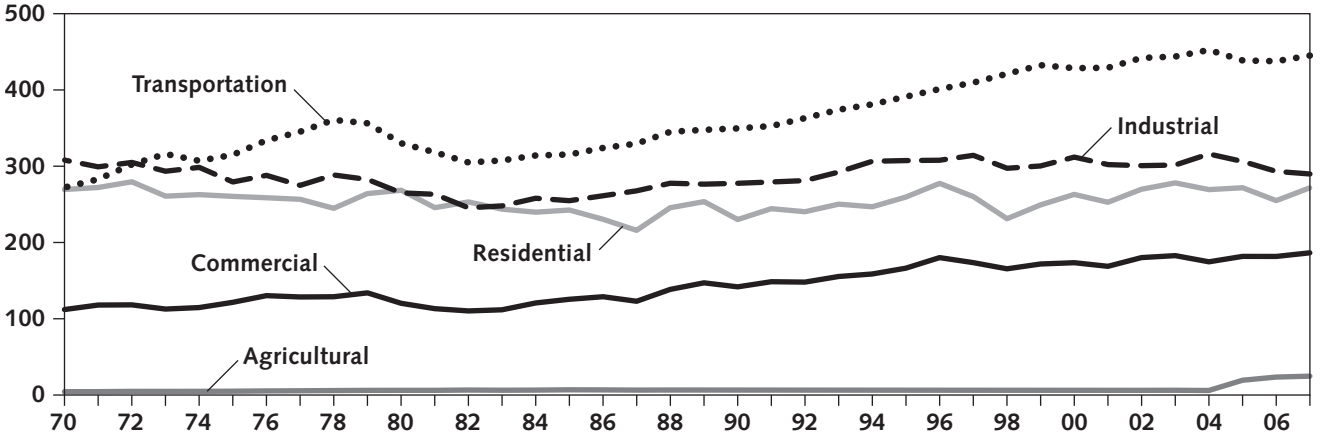
[r] Revised due to revisions in contributing tables.

Source: Compiled from tables in this publication for Wisconsin petroleum, natural gas, coal, renewable and electricity use, by economic sector, and for Wisconsin electric utility energy use.

Wisconsin End Use Energy Consumption, by Economic Sector[r] 1970-2007

(Trillions of Btu and Percent of Total)

End use energy consumption increased 2.3 percent in 2007, after decreasing 2.6 percent in 2006. The transportation sector continues to be the largest user of energy.



Year	Residential		Commercial		Industrial		Agricultural		Transportation		Total
1970	268.6	(27.9%)	111.2	(11.6%)	307.1	(31.9%)	3.5	(0.4%)	271.2	(28.2%)	961.6
1975	259.6	(26.6%)	120.6	(12.4%)	278.5	(28.5%)	4.1	(0.4%)	314.0	(32.1%)	976.8
1980	267.6	(27.2%)	119.4	(12.1%)	264.1	(26.8%)	5.3	(0.5%)	329.2	(33.4%)	985.6
1985	241.6	(25.7%)	124.7	(13.3%)	253.9	(27.0%)	6.0	(0.6%)	314.5	(33.4%)	940.7
1990	229.2	(22.9%)	140.9	(14.1%)	276.7	(27.6%)	5.6	(0.6%)	348.7	(34.8%)	1,001.1
1995	258.7	(23.0%)	165.5	(14.7%)	306.5	(27.2%)	5.4	(0.5%)	390.3	(34.3%)	1,126.4
2000	262.1	(22.2%)	172.6	(14.6%)	311.0	(26.4%)	5.3	(0.6%)	427.7	(35.6%)	1,178.8
2001	251.8	(21.8%)	167.9	(14.5%)	301.2	(26.1%)	5.3	(0.6%)	428.2	(36.5%)	1,154.4
2002	268.9	(22.5%)	179.3	(15.0%)	299.9	(25.1%)	5.3	(0.6%)	441.1	(36.3%)	1,194.5
2003	277.2	(22.9%)	181.9	(15.1%)	300.7	(24.9%)	5.4	(0.6%)	442.9	(36.0%)	1,208.0
2004	268.4	(22.1%)	173.7	(14.3%)	315.1	(26.0%)	5.0	(0.6%)	451.5	(36.5%)	1,213.8
2005[a]	270.9	(22.3%)	180.9	(14.9%)	305.4	(25.2%)	18.5	(1.6%)	437.8	(35.2%)	1,213.4
2006[a]	253.9	(21.4%)	180.8	(15.2%)	292.3	(24.6%)	22.7	(2.0%)	436.8	(35.9%)	1,186.5
2007[p,a]	**270.8**	**(22.3%)**	**185.6**	**(15.3%)**	**289.0**	**(23.8%)**	**23.9**	**(2.2%)**	**444.2**	**(35.5%)**	**1,213.4**

[a] OEI discontinued a per-acre approach to gathering fuel data for the agriculture sector and substituted data from the Wisconsin Department of Revenue and from the federal National Agriculture Statistics Service (NASS). Data from NASS were not available previously. Using former methodology, the figures for 2005 through 2007 are: 2005, 19.6 (1.7%); 2006, 19.5 (1.8%); and 2007, 19.4 (1.8%).

[p] Preliminary estimates.

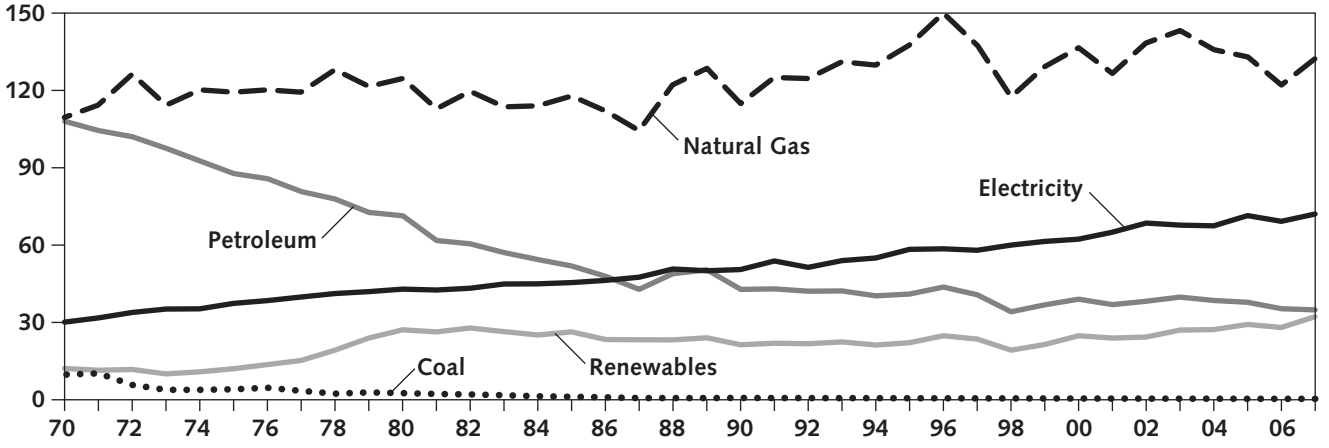
[r] Revised due to revisions in contributing tables.

Source: Compiled from tables in this publication for Wisconsin petroleum, natural gas, coal, renewable energy and electricity use, by economic sector, and for Wisconsin electric utility energy use.

Wisconsin Residential Energy Use, by Type of Fuel[r] 1970-2007

(Trillions of Btu and Percent of Total)

Residential end use energy increased 6.7 percent in 2007. Natural gas continues to be the dominant fuel used in Wisconsin homes, providing almost half of the end use energy used.



Year	Petroleum		Natural Gas		Coal		Renewables[a]		Electricity		Total End Use	Total Resource[b]
1970	107.9	(40.2%)	109.4	(40.7%)	9.5	(3.5%)	11.9	(4.4%)	29.9	(11.1%)	268.6	326.7
1975	87.6	(33.7)	119.2	(45.9)	3.8	(1.5)	11.8	(4.5)	37.2	(14.3)	259.6	338.7
1980	71.2	(26.6)	124.5	(46.5)	2.3	(0.9)	26.9	(10.1)	42.7	(16.0)	267.6	356.3
1985	51.7	(21.4)	117.7	(48.7)	0.9	(0.4)	26.1	(10.8)	45.2	(18.7)	241.6	338.1
1990	42.6	(18.6)	114.7	(50.1)	0.4	(0.2)	21.1	(9.2)	50.3	(22.0)	229.2	353.3
1995	40.8	(15.8)	137.5	(53.2)	0.3	(0.1)	21.9	(8.5)	58.2	(22.5)	258.7	401.7
2000	38.8	(14.8)	136.4	(52.0)	0.2	(0.1)	24.6	(9.4)	62.1	(23.7)	262.1	405.7
2001	36.7	(14.6)	126.4	(50.2)	0.2	(0.1)	23.7	(9.4)	64.8	(25.7)	251.8	404.9
2002	38.0	(14.1)	138.3	(51.4)	0.2	(0.1)	24.1	(9.0)	68.4	(25.4)	268.9	419.7
2003	39.6	(14.3)	143.1	(51.6)	0.2	(0.1)	26.8	(9.7)	67.6	(24.4)	277.2	426.4
2004	38.3	(14.3)	135.7	(50.6)	0.1	(0.0)	27.0	(10.1)	67.3	(25.1)	268.4	417.1
2005	37.6	(13.9)	132.9	(49.1)	0.1	(0.0)	29.0	(10.7)	71.3	(26.3)	270.9	424.9
2006	35.1	(13.8)	121.9	(48.0)	0.1	(0.0)	27.8	(11.0)	69.0	(27.2)	253.9	397.1
2007[p]	**34.7**	**(12.8)**	**132.2**	**(48.8)**	**0.1**	**(0.0)**	**32.0**	**(11.8)**	**71.9**	**(26.5)**	**270.8**	**431.0**

[a] Renewables includes wood, solar, wind and biogas.

[b] Includes energy resources (and losses) attributable to electricity generation.

[p] Preliminary estimates.

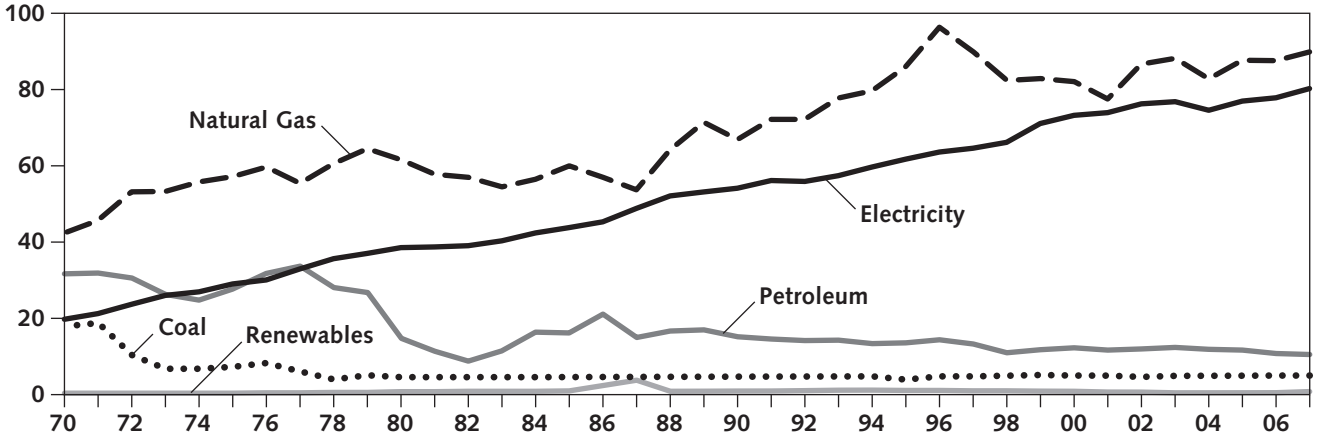
[r] Revised due to revisions in contributing tables.

Source: Compiled from tables in this publication for Wisconsin petroleum, natural gas, coal, renewables and electricity use, by economic sector, and for Wisconsin electric utility energy use.

Wisconsin Commercial Energy Use, by Type of Fuel[r] 1970-2007

(Trillions of Btu and Percent of Total)

In 2007, commercial sector energy increased 6.5 percent. Since 1980, commercial end use energy has increased 82.8 percent. Electricity energy use doubled over the same period.



Year	Petroleum		Natural Gas		Coal		Renewables[a]		Electricity		Total End Use	Total Resource[b]
1970	31.5	(28.3%)	42.2	(38.0%)	17.7	(15.9%)	0.2	(0.2%)	19.6	(19.0%)	111.2	149.3
1975	27.5	(22.8)	57.0	(47.2)	7.1	(5.9)	0.2	(0.2)	28.8	(24.8)	120.6	182.0
1980	14.6	(12.2)	61.4	(51.4)	4.4	(3.7)	0.6	(0.5)	38.4	(32.3)	119.4	199.1
1985	16.0	(12.8)	59.8	(48.0)	4.4	(3.5)	0.8	(0.6)	43.6	(36.2)	124.7	217.6
1990	15.0	(10.6)	66.7	(47.3)	4.5	(3.2)	0.8	(0.5)	54.0	(39.7)	140.9	274.1
1995	13.4	(8.1)	85.8	(51.9)	3.8	(2.3)	0.9	(0.6)	61.6	(37.2)	165.5	316.9
2000	12.1	(7.0)	81.9	(47.5)	4.8	(2.8)	0.7	(0.4)	73.1	(42.3)	172.6	341.4
2001	11.5	(6.9)	77.3	(46.0)	4.8	(2.9)	0.5	(0.3)	73.8	(43.9)	167.9	342.2
2002	11.8	(6.6)	86.5	(48.2)	4.5	(2.5)	0.5	(0.3)	76.1	(42.4)	179.3	347.1
2003	12.2	(6.7)	88.0	(48.4)	4.7	(2.6)	0.3	(0.2)	76.6	(42.1)	181.9	351.1
2004	11.7	(6.7)	82.6	(47.5)	4.8	(2.7)	0.3	(0.2)	74.4	(42.8)	173.7	338.1
2005	11.5	(6.4)	87.5	(48.4)	4.8	(2.6)	0.3	(0.2)	76.8	(42.5)	180.9	346.9
2006	10.6	(5.9)	87.4	(48.3)	4.8	(2.7)	0.3	(0.2)	77.7	(43.0)	180.8	341.9
2007[p]	**10.3**	**(5.6)**	**89.7**	**(48.3)**	**4.8**	**(2.6)**	**0.6**	**(0.3)**	**80.1**	**(43.2)**	**185.6**	**364.0**

[a] Renewables includes solar, wood, biomass, wind, hydro and biogas.

[b] Includes energy resources (and losses) attributable to electricity generation.

[p] Preliminary estimates.

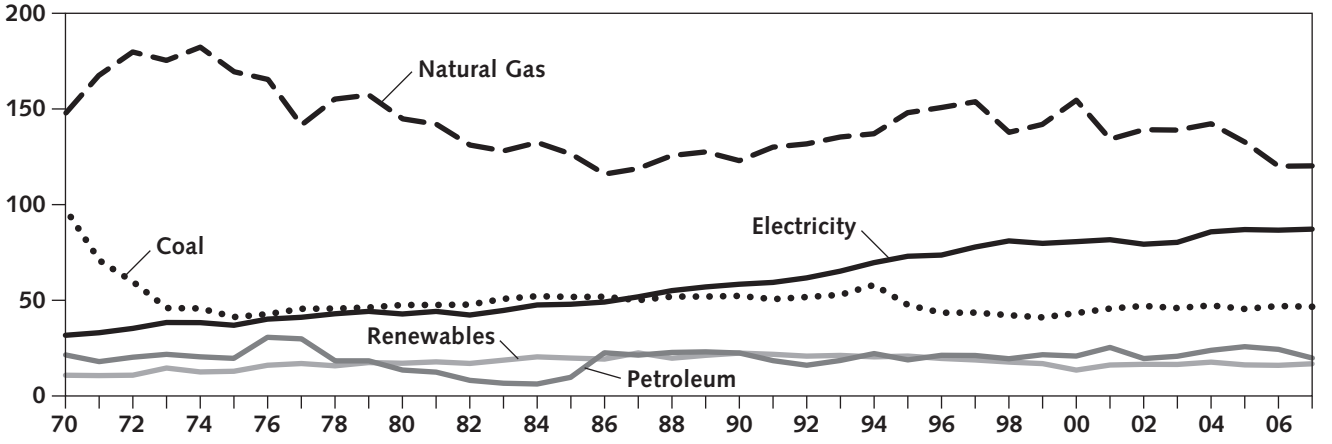
[r] Revised due to revisions in contributing tables.

Source: Compiled from tables in this publication for Wisconsin petroleum, natural gas, coal, renewables and electricity use, by economic sector, and for Wisconsin electric utility energy use.

Wisconsin Industrial Energy Use, by Type of Fuel[r] 1970-2007

(Trillions of Btu and Percent of Total)

End use energy consumption in the industrial sector decreased 2.4 percent in 2007. The major industrial energy sources are natural gas and electricity, trailed by coal, petroleum and renewables. While petroleum continues to be the largest end use energy source in Wisconsin, in the industrial sector petroleum use only exceeds renewables.



Year	Petroleum		Natural Gas		Coal		Renewables[a]		Electricity		Total End Use	Total Resource[b]
1970	21.1	(6.9%)	147.1	(47.9%)	97.1	(31.6%)	10.5	(3.4%)	31.4	(10.2%)	307.1	368.1
1975	19.3	(6.9)	169.1	(60.7)	40.9	(14.7)	12.6	(4.5)	36.6	(13.1)	278.5	356.3
1980	13.2	(5.0)	144.5	(54.7)	47.2	(17.9)	16.7	(6.3)	42.5	(16.1)	264.1	352.4
1985	9.4	(3.7)	126.1	(49.7)	51.4	(20.2)	19.4	(7.5)	47.6	(18.7)	253.9	355.3
1990	22.1	(8.0)	122.6	(44.3)	51.9	(18.8)	22.1	(7.7)	58.0	(21.0)	276.7	420.0
1995	18.5	(6.0)	147.7	(48.2)	47.2	(15.4)	20.5	(6.7)	72.7	(23.7)	306.5	485.3
2000	20.5	(6.6)	154.1	(49.5)	43.0	(13.8)	13.2	(4.2)	80.3	(25.8)	311.0	496.6
2001	25.0	(8.3)	133.8	(44.4)	45.3	(15.0)	15.8	(5.3)	81.3	(27.0)	301.2	493.3
2002	19.2	(6.4)	138.8	(46.3)	46.7	(15.6)	16.2	(5.4)	79.0	(26.3)	299.9	473.9
2003	20.4	(6.8)	138.6	(46.1)	45.6	(15.2)	16.1	(5.4)	79.9	(26.6)	300.7	477.1
2004	23.5	(7.5)	141.9	(45.0)	47.0	(14.9)	17.3	(5.5)	85.4	(27.1)	315.1	503.9
2005	25.4	(8.3)	132.3	(43.3)	45.1	(14.8)	15.9	(5.2)	86.6	(28.4)	305.3	492.5
2006	24.0	(8.2)	119.7	(40.9)	46.7	(16.0)	15.7	(5.4)	86.3	(29.5)	292.3	471.3
2007[p]	**19.5**	**(6.7)**	**119.9**	**(41.5)**	**46.3**	**(16.0)**	**16.5**	**(5.7)**	**86.8**	**(30.1)**	**289.0**	**482.4**

[a] Renewables includes hydro, wood, biogas and biomass.

[b] Includes energy resources (and losses) attributable to electricity generation.

[p] Preliminary estimates.

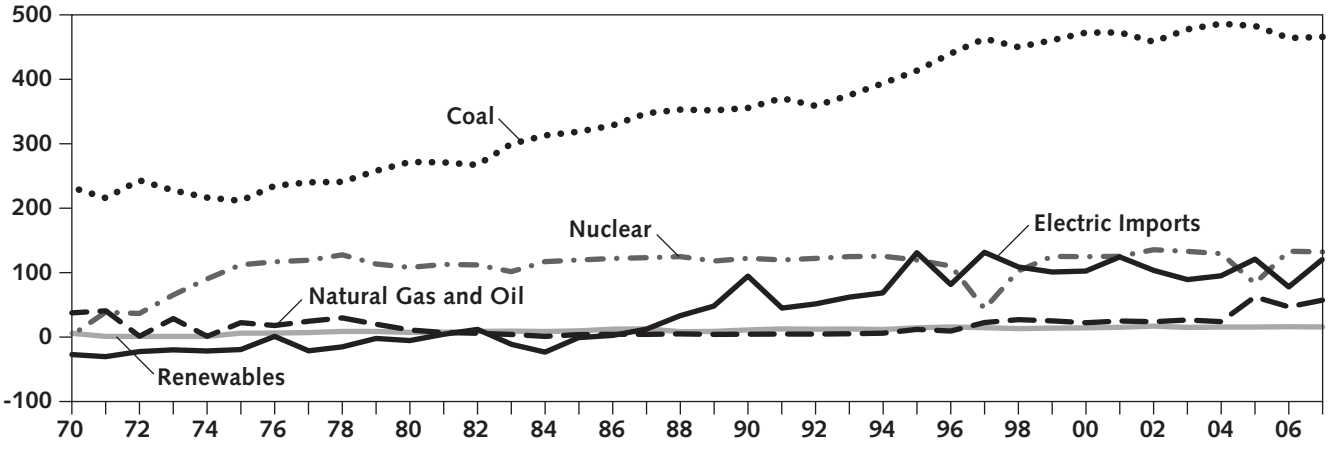
[r] Revised due to revisions in contributing tables.

Source: Compiled from tables in this publication for Wisconsin petroleum, natural gas, coal, renewables and electricity use, by economic sector, and for Wisconsin electric utility energy use.

Wisconsin Energy Use for Electricity Generation, in Btu, by Type of Fuel, 1970-2007

(Trillions of Btu and Percent of Total)

A warmer summer, with 9.8 percent more cooling degree days than 2006, increased energy use for electricity generation by 7.3 percent in 2007.



Year	Petroleum	Natural Gas	Coal[a]	Renewables	Nuclear[b]	Electric Imports[c]	Hydro	Total
1970	7.9 (3.2%)	31.1 (12.5%)	231.1 (93.0%)	4.8 (1.9%)	1.7 (0.7%)	(28.2) -(11.4%)	6.0 (2.4%)	248.4
1975	7.8 (2.3)	19.8 (5.9)	210.5 (63.0)	5.1 (1.5)	111.2 (33.3)	(20.4) -(6.1)	6.3 (1.9)	333.9
1980	4.8 (1.2)	14.1 (3.6)	270.7 (68.3)	6.3 (1.6)	107.0 (27.0)	(6.5) -(1.6)	6.9 (1.8)	396.5
1985	1.4 (0.3)	1.4 (0.3)	317.7 (71.2)	8.7 (1.9)	118.6 (26.6)	(1.8) -(0.4)	8.7 (2.0)	445.9
1990	1.0 (0.2)	2.4 (0.4)	354.5 (60.9)	10.0 (1.7)	121.2 (20.8)	93.2 (16.0)	5.6 (1.0)	582.3
1995	0.8 (0.1)	10.1 (1.5)	412.4 (60.2)	13.3 (1.9)	118.5 (17.3)	129.4 (18.9)	6.5 (1.0)	684.5
2000	1.6 (0.2)	19.6 (2.7)	471.4 (64.5)	13.2 (1.8)	123.8 (16.9)	101.4 (13.9)	6.2 (0.9)	731.0
2005	1.8 (0.2)	59.4 (7.8)	481.7 (63.5)	14.6 (1.9)	81.8 (10.8)	119.7 (15.8)	8.3 (1.1)	759.0
2006	1.4 (0.2)	44.5 (6.1)	463.0 (63.2)	15.0 (2.0)	132.1 (18.0)	76.5 (10.4)	7.8 (1.1)	732.5
2007[p]	**1.7 (0.2)**	**54.5 (6.9)**	**464.7 (59.1)**	**14.6 (1.9)**	**131.2 (16.7)**	**119.5 (15.2)**	**5.5 (0.7)**	**786.2**

[a] Includes petroleum coke.

[b] Based on 10,800 Btu per kWh.

[c] Estimated assuming 11,300 Btu of resource energy per kWh imported into Wisconsin. Numbers in parentheses and negative percentages indicate resource energy used in Wisconsin to produce electricity that was exported.

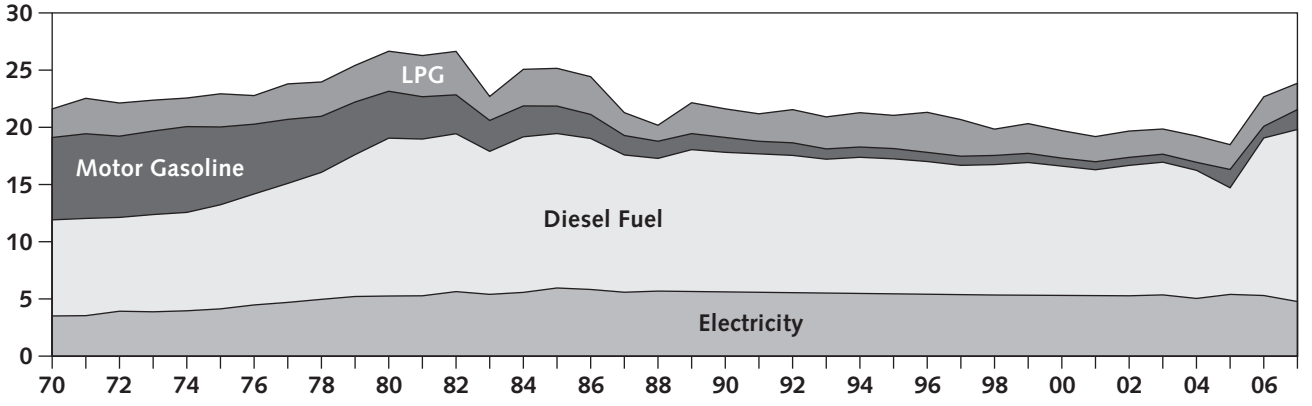
[p] Preliminary estimates.

Source: Public Service Commission of Wisconsin, Accounts and Finance Division, *Statistics of Wisconsin Public Utilities*, Bulletin #8 (1970-1994); U.S. Department of Agriculture, Rural Electrification Administration, *Annual Statistical Report*, REA Bulletin 1-1 (1970-1995); Wisconsin Department of Natural Resources, Annual Survey of Point Source Emissions, unpublished (1971-1995); American Gas Association, *Gas Facts* (1970-1995); U.S. Department of Energy, Energy Information Administration, *Electric Power Monthly*, [DOE/EIA-0226(05/06)] (May 2006); Public Service Commission of Wisconsin, unpublished utility fuel data (2005-2007); telephone survey of wastewater treatment facilities and landfills on biogas production (2007).

Wisconsin Agricultural Energy Use, in Btu, by Type of Fuel 1970-2007

(Trillions of Btu and Percent of Total)

Agricultural energy use is affected by changes in mechanization and automation, and by advances in technology such as biodiesel. Starting in 2005, OEI shifted from a per acre approach to gathering fuel data to new data resources for petroleum fuels. All totals in this table are the sums of the new methodology figures beginning in 2005.



Year	Motor Gasoline	Diesel Fuel[a]	LPG	Total Petroleum		Electricity		Total End Use	Total Resource Use[b]
1970	7.2	8.4	2.5	18.1	(83.8%)	3.5	(16.2%)	21.6	28.4
1975	6.8	9.1	2.9	18.8	(82.0)	4.1	(18.0)	22.9	31.7
1980	4.1	13.8	3.5	21.4	(80.3)	5.3	(19.7)	26.7	37.6
1985	2.4	13.5	3.3	19.2	(76.3)	6.0	(23.7)	25.2	37.8
1990	1.3	12.2	2.5	16.0	(74.0)	5.6	(26.0)	21.6	35.5
1995	0.9	11.8	2.9	15.6	(74.1)	5.4	(25.9)	21.0	34.4
2000	0.7	11.3	2.4	0.0	(0.0)	5.3	(100.0)	5.3	17.6
2005[c]	1.6	9.3	2.2	13.1	(70.8)	5.4	(29.2)	18.5	30.2
2006[c]	1.0	13.8	2.6	17.4	(76.6)	5.3	(23.4)	22.7	33.6
2007[p,c]	**1.7**	**15.0**	**2.3**	**19.1**	**(80.0)**	**4.8**	**(20.0)**	**23.9**	**34.5**

[a] Includes other light distillates.

[b] Includes energy resources (and losses) attributed to electricity generation.

[c] See the narrative at the top of the page regarding the change in agriculture methodology changes. Using former methodology, the figures for 2005 through 2007 are as follows. Motor Gasoline—2005, 0.7; 2006, 0.7; and 2007, 0.7. Diesel Fuel—2005, 11.5; 2006, 11.6; and 2007, 11.6. LPG—2005, 2.0; 2006, 1.9, and 2007, 1.9. All totals in the table reflect current methodology.

[p] Preliminary estimates.

Source: Wisconsin Department of Administration, Division of Energy, based on U.S. Department of Agriculture, *Energy and U. S. Agriculture: 1974 Data Base* (September 1976), *1978 Census of Agriculture* (1980) and *Farm Production Expenditures* (1980-1984); Wisconsin Department of Agriculture, Trade, and Consumer Protection, *Wisconsin Agricultural Statistics* (1974-2006) and *Wisconsin Dairy Facts* (1982-2006); Wisconsin Department of Revenue fuels sales and tax data (2007); National Agriculture Statistics Service, unpublished expenditure data (2007).

Wisconsin Agricultural Energy Use, in Gallons and kWh, by Type of Fuel, 1970-2007

(Millions of Gallons and Millions of kWh)

Although farmers use manure digesters and other forms of energy generation such as biomass, and biodiesel to power and heat their farm, their primary energy comes from petroleum sources.

The Office of Energy Independence, in collaboration with the National Agricultural Statistics Service and the Wisconsin Department of Agriculture, Trade and Consumer Protection instituted a new method of data collection for fuels used in the agricultural sector. Starting in 2005, agricultural sector data have been revised to reflect the new data collection method. The total column in this table reflects that new methodology.

Year	Motor Gasoline	Diesel Fuel[a]	LPG	Total Petroleum	Electricity (Millions of kWh)
1970	58.0	60.7	26.2	144.9	1,028
1975	54.3	65.8	30.1	150.2	1,210
1980	33.0	99.3	36.9	169.2	1,539
1985	19.1	97.8	34.6	151.5	1,745
1990	10.1	88.5	25.9	124.5	1,645
1995	6.9	85.0	30.9	122.8	1,595
2000	5.8	81.4	25.3	112.5	1,555
2001	5.7	79.5	23.5	108.7	1,550
2002	5.8	82.1	24.0	111.9	1,545
2003	6.0	84.1	22.8	112.9	1,568
2004	5.8	81.2	24.1	111.1	1,477
2005[b]	12.8	67.2	22.7	102.7	1,581
2006[b]	8.1	99.3	27.1	134.5	1,552
2007[P,b]	**13.9**	**108.4**	**24.1**	**146.5**	**1,398**

[a] Fuel oil and kerosene.

[b] See the narrative at the top of the page regarding the change in agriculture methodology changes. Using former methodology, the figures for 2005 through 2007 are as follows. Motor Gasoline—2005, 5.9; 2006, 6.0; and 2007, 6.0. Diesel Fuel—2005, 82.7; 2006, 83.5; and 2007, 83.3. LPG—2005, 20.5; 2006, 19.6, and 2007, 16.7. All totals in the table reflect current methodology.

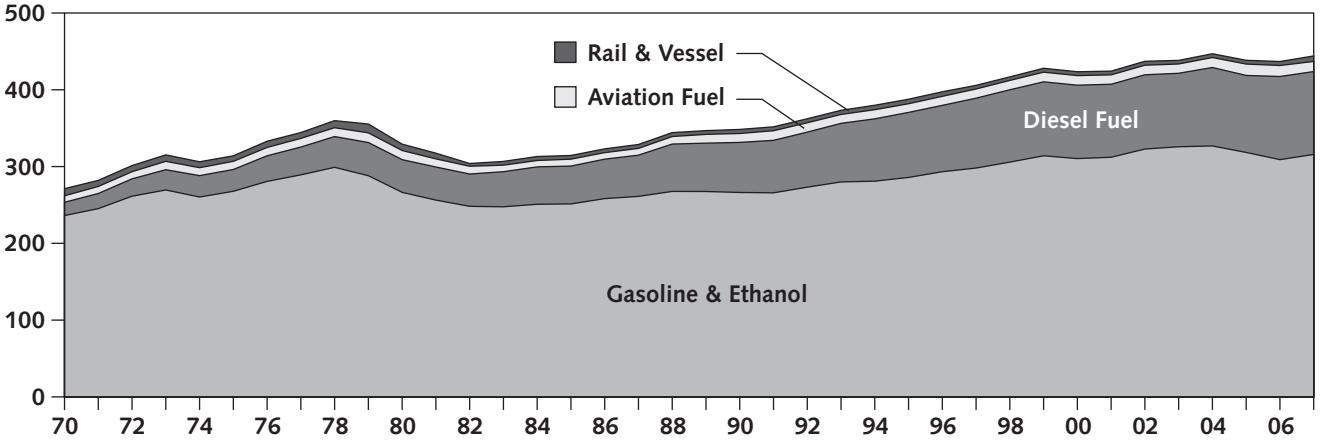
[P] Preliminary estimates.

Source: Wisconsin Department of Administration, Division of Energy, based on U.S. Department of Agriculture, *Energy and U. S. Agriculture: 1974 Data Base* (September 1976), *1978 Census of Agriculture* (1980) and *Farm Production Expenditures* (1980-1984); Wisconsin Department of Agriculture, Trade, and Consumer Protection, *Wisconsin Agricultural Statistics* (1974-2005) and *Wisconsin Dairy Facts* (1982-2005); and Wisconsin Department of Revenue, *Motor Vehicle Fuel Tax Statistics* (1991-2007). Unpublished data from the National Agricultural Statistics Service (2007).

Wisconsin Transportation Energy Use, in Btu, by Type of Fuel 1970-2007

(Trillions of Btu)

Transportation energy use increased 1.8 percent in 2007. Motor gasoline use increased 1.5 percent, while ethanol use increased 23.6 percent. Diesel fuel use decreased 0.3 percent. The increase in ethanol consumption in Wisconsin is due in part to the availability of ethanol, E10 and E85, across the state. From August 2007 to August 2008, the number of gas stations selling E85 increased by 66 percent, from 67 to 111.



Year	Motor Gasoline[a]	Ethanol	Diesel Fuel	Aviation Gasoline	Aviation Jet Fuel	Rail Distillate & Residual	LPG	Total[b]
1970	236.2		17.3	0.7	7.7	9.3	NA	271.2
1975	267.8		28.4	0.8	9.8	7.2	NA	314.0
1980	266.4		42.6	0.9	11.0	8.3	NA	329.2
1985	251.2	0.1	49.3	0.6	8.4	4.8	NA	314.4
1990	265.6	0.7	65.2	0.6	11.0	5.3	NA	348.4
1995	281.7	4.1	84.7	0.7	10.6	5.9	0.6	388.3
2000	302.5	7.9	95.6	0.8	11.7	5.0	0.5	424.0
2005	307.2	10.4	100.3	0.5	14.3	4.6	0.3	437.6
2006	297.7	11.0	108.3	0.4	13.9	4.9	0.3	436.5
2007[p]	**302.2**	**13.6**	**108.0**	**0.4**	**12.8**	**7.2**	**0.2**	**444.3**

[a] Excludes ethanol.

[b] Since 1994, fewer than .05 trillion Btu of compressed natural gas (CNG) were used for highway transportation.

[p] Preliminary estimate.

NA – Not available.

Source: Wisconsin Department of Commerce, Bureau of Petroleum Inspection, *Report on Petroleum Products Inspected and Delivered to Wisconsin* (1970-1995); Wisconsin Department of Revenue, *Motor Vehicle Fuel Tax Statistics* (1970-2007) and *Petroleum Supply Annual*, DOE/EIA-3340 (1982-2007); US Department of Energy, Form EIA-782C, "Monthly Report of Petroleum Products Sold for Consumption" (1983-2007); WI Office of Energy Independence telephone surveys of airport fixed base operators and railways.

Wisconsin Transportation Energy Use, in Gallons, by Type of Fuel, 1970-2007

(Millions of Gallons)

Despite an increasing state population, stagnant motor vehicle fuel efficiencies, higher gasoline and diesel fuel prices, Wisconsin saw a 1.5 percent increase in total motor gasoline usage.

Year	Motor Gasoline[a]	Ethanol	Diesel Fuel	Aviation Gasoline	Aviation Jet Fuel	Distillate & Residual Rail	Distillate & Residual Vessel	LPG	Total[b]
1970	1,889.1		124.8	5.9	56.7	49.2	17.0	NA	2,142.7
1975	2,142.8		205.1	6.7	72.4	36.6	14.1	NA	2,477.7
1980	2,130.7		307.1	7.0	81.4	44.8	14.8	NA	2,585.8
1985	2,009.7	1.5	356.9	4.5	62.2	27.1	7.4	NA	2,469.3
1990	2,124.4	8.3	471.1	5.0	81.6	28.6	9.0	NA	2,728.0
1995	2,254.1	48.5	612.5	5.6	78.6	35.1	6.9	6.1	3,047.4
2000	2,419.4	93.8	691.2	6.0	87.0	35.9	0.0	5.3	3,338.6
2001	2,438.6	85.9	687.7	5.9	85.0	35.2	0.0	4.6	3,342.9
2002	2,523.0	88.2	698.9	4.9	88.2	36.9	0.0	4.0	3,444.1
2003	2,538.7	100.9	692.1	4.3	86.1	33.7	0.0	3.8	3,459.6
2004	2,545.6	102.5	738.5	4.2	92.5	35.7	0.0	3.7	3,522.7
2005	2,457.6	123.0	724.8	4.1	105.7	35.1	0.0	3.0	3,453.4
2006	2,381.9	130.4	782.5	3.5	102.9	37.2	0.0	3.2	3,441.6
2007[P]	**2,417.4**	**161.2**	**780.4**	**2.8**	**94.6**	**51.6**	**0.0**	**2.3**	**3,510.3**

[a] Excludes ethanol. See adjacent column for amounts of ethanol mixed with gasoline to form RFG and gasohol.

[b] From 1994 to the present, .206 million gasoline gallon equivalents of compressed natural gas were used for highway transportation. These data appear on page 29 as natural gas sales to the commercial sector.

NA – Not available.

[P] Preliminary estimate.

Source: Wisconsin Department of Commerce, Bureau of Petroleum Inspection, *Report on Petroleum Products Inspected and Delivered to Wisconsin* (1970-1995); Wisconsin Department of Revenue, *Motor Vehicle Fuel Tax Statistics* (1970-2007) and *Petroleum Supply Annual*, DOE/EIA-3340 (1982-2007); US Department of Energy, Form EIA-782C, "Monthly Report of Petroleum Products Sold Into States for Consumption" (1983-2007); WI Office of Energy Independence telephone surveys of airport fixed base operators and railways.